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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF540

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Biorka Island Dock Replacement Project

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an Incidental Harassment Authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to the Federal Aviation Administration (FAA) to incidentally harass, by Level A and Level B harassment, marine mammals during construction activities associated with the Biorka dock replacement project in Symonds Bay, AK.

DATES: This Authorization is applicable from May 1, 2018, through April 30, 2019.

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An Incidental Take Authorization (ITA) shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined "negligible impact" in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term "take" means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act (NEPA) of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e*., the issuance of an incidental harassment authorization) with respect to environmental consequences on the human environment. This action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHA qualifies to be categorically excluded from further NEPA review and a Categorical Exclusion memo was signed in October 2017.

Summary of Request

On March 31, 2017, NMFS received a request from the FAA for an IHA to take marine mammals incidental to pile driving and removal and down the hole (DTH) drilling in association with the Biorka Island Dock Replacement Project (Project) in Symonds Bay, Alaska. The FAA's request is for take of five species by Level A and Level B harassment. Neither the FAA nor NMFS expect mortality to result from this activity and, therefore, an IHA is appropriate.

In-water work associated with the in-water construction is expected to be completed within 70 days starting May 1, 2018. We expect the in-water construction work to occur between May 1, 2018 through September 30, 2018; however, this IHA is valid for one year, from May 1, 2018, through April 30, 2019.

Description of the Specified Activity

Overview

The FAA is constructing a replacement dock on Biorka Island in Symonds Bay near Sitka, Alaska. The purpose of the Project is to improve and maintain the sole point of access to Biorka Island and the navigational and weather facilities located on the island. The existing dock has deteriorated and reached the end of its useful life. Regular and repetitive heavy surging seas, along with constant use have destroyed the face of the existing floating marine dock, and have broken cleats making it difficult to tie a vessel to the existing dock. In its present condition, small vessels cannot use the dock to provide supplies to facilities on the island. The existing barge landing area is reinforced seasonally by adding fill to the landing at the shoreline, which is periodically washed away by storms and wave action. The Project would reconstruct the deteriorated existing dock and construct an improved barge landing area. A detailed description of the planned dock replacement project is provided in the *Federal Register* notice for the proposed IHA (82 FR 41229; August 30, 2017). Since that time, no changes have been made to the planned activities. Therefore, a detailed description is not provided here. Please refer to that *Federal Register* notice for the description of the specific activity.

Table 1 provides a summary of the six methods of construction ("scenarios") used in the modeling of the zone of influence (ZOI)s for the Biorka Project. The ZOIs effectively represent the mitigation zone that would be established around each pile to prevent Level A harassment to marine mammals, while providing estimates of the areas within which Level B harassment might occur.

Table 1. Pile Driving Modeling Scenarios for the Biorka Project.

Scenario	Description	Piles installed per day	Vibratory		DTH		Impact		Shift (hr)
			Hrs per pile	Total hours per day	Hours per pile	Total hours per day	Hours per pile	Total strikes per day	
S1	Removal of existing piles and installation/removal of temporary piles[1]	21	0.33	6.93	NA[2]		NA[2]		6.93
S2	Installation of 18-inch pipe piles (dock and dolphin)	3		0.99	2	6	0.17	15	7.49
S3	Installation of 18-inch pipe piles (barge landing)	4		1.32	NA		0.33	2720	2.65
S4	Installation of 30-inch pipe piles (dolphins)	2		0.66	2	4	0.17	10	4.99
S5	Installation of H piles (dock wave barrier)	8		2.64	NA[2]		0.33	5440	5.31
S6	Installation of sheet piles (dock wave barrier and barge landing)	12		3.96	NA[2]		0.25	6120	6.96

[1]Existing piles to be removed include 3 24 in concrete piles, 14 8 in steel piles, 8 10 in steel piles, 14 12.75 in steel piles, and 7 14 to 8 in timber piles.
[2]NA indicates when a pile driving method was not required in a given scenario.

Comment and Responses

A notice of NMFS's proposal to issue an IHA to the FAA was published in the *Federal Register* on August 30, 2017 (82 FR 41229). That notice described, in detail, the FAA's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission (Commission).

Comment 1: The Commission has concerns regarding the appropriateness of the manner in which NMFS has estimated Level A harassment zones. The Commission recommends that NMFS consult with both internal and external scientists and acousticians to determine the

appropriate accumulation time that action proponents should use to determine the extent of the Level A harassment zones based on the associated permanent threshold shift (PTS) cumulative sound exposure level (SEL_{cum}) thresholds for the various types of sound sources, including stationary sound sources, when simple area x density methods are employed. Estimated swimming speeds of various species and behavior patterns (including residency patterns) should be considered, and multiple scenarios should be evaluated using animat modeling.

Response: NMFS will take the Commission's recommendation into consideration and will consult with internal scientists on this issue in the future; however it does not change our isopleths or the number of takes for this specific action. We also welcome the Commission and its Committee of Scientific Advisors on Marine Mammals to provide guidance on this issue.

Comment 2: The Commission is unsure why NMFS is not implementing consistent measures for action proponents that plan to conduct similar activities (*e.g*. shutdowns for vibratory driving and DTH drilling). The Commission recommends that NMFS (1) determine whether action proponents would be required to implement delay or shut-down procedures during use of vibratory and down-the-hole hammers and (2) require, or refrain from requiring, those measures consistently for all authorizations involving those activities.

Response: NMFS has confirmed that the FAA will be required to implement shutdown and delay procedures during the use of all construction equipment, including vibratory driving and removal and DTH drilling. In the future, NMFS will ensure consistency across all authorizations in our mitigation requirements.

Comment 3: The Commission recommended that NMFS share the rounding criteria with the Commission such that the matter of when rounding should occur in the take calculation can be resolved in the near future.

Response: NMFS will share the rounding criteria with the Commission soon and looks forward to working with them in the future to resolve this issue.

Description of Marine Mammals in the Area of the Specified Activity

There are five marine mammal species that may transit through the waters nearby the Project area, and are likely to potentially be taken by the specified activity. These include the Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), killer whale (*Orcinus orca*), and humpback whale (*Megaptera noviaeangliae*). Multiple additional marine mammal species may occasionally enter Sitka sound but are not expected to be present in the shallow nearshore waters of the action area.

Sections 3 and 4 of the FAA's application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SAR; *www.nmfs.noaa.gov/pr/sars/*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 2 lists all species with expected occurrence in Symonds Bay and Sitka Sound and summarizes information related to the population or stock, including potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality are included here as gross indicators of the status of the species and other threats.

A detailed description of the of the species likely to be affected by the Project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the *Federal Register* notice for the proposed IHA (82 FR 41229; August 30, 2017); since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that *Federal Register* notice for these descriptions. Please also refer to NMFS' website (*www.nmfs.noaa.gov/pr/species/mammals/)* for generalized species accounts.

Table 2. Marine Mammals Potentially Present in the Vicinity of Biorka Island.

Species	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR[3]	Annual M/SI[4]	Relative occurrence in Symonds Bay and Sitka Sound; season of occurrence
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Phocoenidae (porpoises)						
Harbor porpoise (*Phocoena phocoena*)	Southeast Alaska	-; Y	11,146 (0.242; n/a; 1997)	Undet.	34	Common
Order Cetartiodactyla – Cetacea – Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae (dolphins)						
Killer whale (*Orcinus orca*)	Eastern North pacific Gulf of Alaska, Aleutian Island, and Bering Sea Transient	-; N	587 (n/a; 587; 2012)	0	0	Infrequent
	West Coast Transient	-; N	243 (n/a; 243; 2009)	2.4	0	
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae						
Humpback whale[5] (*Megaptera novaeangliae*)	Central North Pacific stock	-; Y	10,103 (0.300; 7,890; 2006)	83	24	Likely
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion (*Eumetopias jubatus)*	Western	E; Y	49,497 (n/a; 49,497; 2014)	297	236	Common
	Eastern	-; N	60,131 (n/a;	1,645	108	

			36,551; 2013)			
Family Phocidae (earless seals)						
Harbor seal (*Phoca vitulina*)	Sitka/Chatham	-; N	14,855 (n/a; 13,212; 2011)	155	77	Common

[1]Endangered Species Act (ESA) status: Yes (Y), No (N), Endangered (E), Threatened (T)/ Marine Mammal Protection Act (MMPA) status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2]CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate.

[3]Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

[4]These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

[5]The humpback whales considered under the MMPA to be part of this stock could be from any of two different distinct population segment (DPS)s. In Alaska, it would be expected to primarily be whales from the Hawaii DPS but could also be whales from Mexico DPS.

Potential Effects of the Specified Activity on Marine Mammals and their Habitat

The effects of underwater noise from construction activities for the Project have the potential to result in behavioral harassment of marine mammals in the vicinity of the action area. The *Federal Register* notice for the proposed IHA (82 FR 41229; August 30, 2017) included a discussion of the effects of anthropogenic noise on marine mammals, therefore that information is not repeated here; please refer to that *Federal Register* notice for that information.

Estimated Take by Incidental Harassment

This section provides an estimate of the number of incidental takes authorized through this IHA, which informed NMFS' consideration of both the "small numbers" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level A and Level B harassment, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to vibratory and impact pile driving and removal and DTH drilling, and potential PTS for animals that may transit through the Level A zones (described below) undetected (Table 6). Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, soft start, ramp-up, etc. – discussed in detail below in *Mitigation Measures* section), Level A harassment is not anticipated; however, a small number of takes by Level A harassment is authorized for most species as a precaution if animals go undetected before a shutdown is in place.

As described previously, no mortality or serious injury is anticipated or authorized for this activity. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or volume of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the take estimate.

The estimation of marine mammal takes typically uses the following calculation since site-specific density is unavailable:

Level B exposure estimate = N (number of animals) in the area * Number of days of noise generating activities.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al*., 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 decibels (dB) re 1 micropascal (μPa) root mean square (rms) for continuous (*e.g*. vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

The FAA's Project activities include the use of continuous (vibratory pile driving and DTH drilling) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa (rms) are applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The FAA's Project activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving and DTH drilling) sources.

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*.

Table 3. Thresholds Identifying the Onset of Permanent Threshold Shift.

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-frequency cetaceans	*Cell 1* Lpk,flat: 219 dB LE,LF,24h: 183 dB	*Cell 2* LE,LF,24h: 199 dB
Mid-frequency cetaceans	*Cell 3* Lpk,flat: 230 dB LE,MF,24h: 185 dB	*Cell 4* LE,MF,24h: 198 dB
High-frequency cetaceans	*Cell 5* Lpk,flat: 202 dB LE,HF,24h: 155 dB	*Cell 6* LE,HF,24h: 173 dB
Phocid Pinnipeds (underwaters)	*Cell 7* Lpk,flat: 218 dB LE,PW,24h: 185 dB	*Cell 8* LE,PW,24h: 201 dB
Otariid Pinnipeds	*Cell 9* Lpk,flat: 232 dB	*Cell 10* LE,OW,24h: 219 dB

(underwater)	LE,OW,24h: 203 dB	

[1]NMFS 2016

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds.

Pile driving and removal and DTH drilling generates underwater noise that can potentially result in disturbance to marine mammals in the Project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$TL = B * \log_{10}(R_1/R_2)$, where

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log[range]).

Underwater Sound – The intensity of pile driving and removal sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. A number of studies, primarily on the west coast, have measured sound produced during underwater pile driving projects. These data are largely for impact driving of steel pipe piles and concrete piles as well as vibratory driving of steel pipe piles.

JASCO Applied Sciences (JASCO) conducted acoustic modeling of pile installation and removal activities planned for the Project, which is included as Appendix A of the FAA's application. To assess potential underwater noise exposure of marine mammals during construction activities, Quijano and Austin (2017) determined source levels for six different construction scenarios (see Table 1). The source levels are frequency-dependent and suitable for modeling underwater acoustic propagation using JASCO's Marine Operations Noise Model (MONM). The modeling predicted the extent of ensonification and the acoustic footprint from construction activities, taking into account the effects of pile driving equipment, bathymetry, sound speed profile, and seabed geoacoustic parameters. Auditory weighting was applied to the modeled sound fields to estimate received levels relative to hearing sensitivities of five marine mammal hearing groups following NMFS 2016 guidance.

The results are based on currently adopted sound level thresholds for auditory injury (Level A) expressed as peak pressure level (PK) and 24-hr SEL, and behavioral disturbance (Level B) expressed as sound pressure level (SPL). Using these guidelines, Quijano and Austin (2017) calculated the maximum extent (distance and ensonified areas) of the Level A and Level B exposure zones for each marine mammal functional hearing group. This was calculated for both impact and vibratory pile driving of 18- and 30-inch (in) piles for each of the following six Project scenarios.

The model required, as input, source sound levels in 1/3-octave bands between 10 hertz (Hz) and 25 kilohertz (kHz). Source levels for sheet pile and H pile installation were obtained from literature, but the available measurements did not cover the full frequency spectrum of interest; data for vibratory installation of sheet and H piles were available to maximum frequencies of 4 kHz and 10 kHz, respectively. Modeling of the six construction scenarios at the Project site on Biorka Island followed three steps:

1. Piles driven into the sediment by impact, vibratory, or downhole drilling were characterized as sound-radiating sources. Source levels in 1/3-octave-bands were obtained by modeling or by adjusting source levels found in the literature. The exact method to obtain the 1/3-octave-band levels depends on the pile geometry and pile driving equipment, and it is described on a case-by-case basis (see Appendix A of the FAA's application);

2. Underwater sound propagation was applied to predict how sound propagates from the pile into the water column as a function of range, depth, and azimuthal direction. Propagation depends on several conditions including the frequency content of the sound, the bathymetry, the sound speed in the water column, and sediment geoacoustics; and

3. The propagated sound field was used to compute received levels over a grid of simulated receivers, from which distances to criteria thresholds and maps of ensonified areas were generated.

Modeled results are presented as tables of distances at which SPLs or SELs fell below thresholds defined by criteria. For marine mammal injury, the Level A thresholds considered here follow the NMFS guidelines (NMFS 2016). A detailed description of the modeling process is provided in Appendix A of the FAA's IHA application. A list of modeling parameters, including pile driving duration for computation of SEL, are provided in Table 1.

Table 4. Modeled Distances to Level A and Level B Exposure Thresholds from Vibratory and Impulsive Sources Modeled Distances to Exposure Thresholds for Non-Impulsive Sources.

Functional Hearing Group	Level A Vibratory Threshold *(dB re1 µPa²·s)*	Level A Impulse Threshold *(dB re1 µPa²·s)*	Distance to Level A Threshold (m)[1]											
			S1[2]		S2		S3		S4		S5		S6	
			Vibratory	Impulse	Vibratory	Impulse	Vibratory	Impulse	Vibratory	Impulse	Vibratory	Impulse	Vibratory	Impulse
LFC[3]	199	183	10	NA	350	30	10	630	260	80	0	670	40	1,360
MFC[4]	198	185	0	NA	10	0	0	10	10	0	0	130	10	220
HFC[5]	173	155	0	NA	510	50	0	770	360	90	10	2,050	10	2,930
PPW[6]	201	185	0	NA	80	10	0	200	60	10	0	290	10	770
OPW[7]	219	203	0	NA	0	0	0	10	0	0	0	10	0	80
	Level B Vibratory Threshold *(dB re1 µPa²·s)*	**Level B Impulse Threshold** *(dB re1 µPa²·s)*	**Distance to Level B Threshold (m)[1]**											
All marine mammals	120	160	1,800	NA	10,002	710	4,270	550	10,002	1,250	790	430	4,720	790

[1] $R_{95\%}$ as modeled in Appendix A (Quijano and Austin 2017).

[2] Scenario 1 does not include impulsive sources.

[3] Low-frequency cetaceans, humpback whales.

[4] Mid-frequency cetaceans, killer whales.

[5] High-frequency cetaceans, harbor porpoise.

[6] Phocid pinnipeds in water, harbor seals.

[6] Otariid pinnipeds in water, Steller sea lions.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

At-sea densities for marine mammal species have not been determined for marine mammals in Sitka Sound; therefore, all estimates here are determined by using observational

data from biologists, peer-reviewed literature, and information obtained from personal communication with researchers and state and Federal biologists, and from local charter boat operators.

Harbor Seals

Harbor seals are expected to be in the Project area in low numbers (see *Description of Marine Mammals in the Area of the Specified Activity* Section). We estimate that up to five harbor seals per day may be present in the Project area on all days of construction. Therefore, we authorize 350 takes by Level B harassment. Because the largest Level A ZOI for harbor seals is nearly 1 kilometer (km) (Scenario 6), the FAA requests up to 13 harbor seal takes by Level A harassment. Level A harassment may occur if the animals enter the ZOI undetected on half of all days of construction in Scenario 6 and one time for each of the other five scenarios, and marine mammal observers (MMO) are not able to request a shutdown prior to the seals being exposed to potential Level A harassment.

Steller sea lion

Steller sea lion abundance in the Project area is dependent on prey availability. Prey species are uncommon during the Project window; therefore, sea lion abundance is expected to be low. The FAA estimates that five sea lions may be in the Project area every day (70 days) of construction, therefore, we estimate that 350 sea lions may be taken by Level B harassment. We estimate that these takes would be split equally between the east distinct population segment (DPS) and west DPS (175 each). The Level A zone is less than 10 m for all but Scenario 6, which is 80 m; however, to be conservative, the FAA is requesting a small group of Steller sea lions may be taken by Level A harassment. This would equate to six total animals if split equally by DPS (3 each).

Humpback whale

Humpback whales are found in Sitka Bay seasonally. During mid-summer, tour boats generally see four to five whales per day, in the middle of Sitka Sound. Therefore, a count of 5 humpback whales per day (70 days) was used to estimate takes per day on every day of construction for a total of 350 takes by Level B harassment. All takes would be from the Central North Pacific stock under the MMPA. For ESA purposes, 93.9 percent would be from the Hawaii DPS (328 animals) and 6.1 percent would be from the Mexico stock (22 animals) based on Wade *et al*., 2016. The maximum distance at which a humpback whale may be exposed to noise levels that exceed Level A thresholds is 1.4 km during Scenario 6. Even though the ensonified area extends outside of the entrance to Symonds Bay, a MMO stationed near the mouth of the bay at Hanus Point would be able to see a humpback whale outside Symonds Bay before it enters the Level A zone and could shut down the noise producing activity to avoid Level A take. In the unlikely event a whale would go undetected and enter the Level A zone, the FAA has requested three takes by Level A harassment for humpback whales. We estimate that all three humpback whales would be from the Hawaii DPS.

Killer whale

Generally, transient killer whales follow the movements of Steller sea lions and harbor seals on which they prey. Given the low numbers of Steller sea lions in Sitka Sound during summer, it is consistent that transient killer whales would also be rare or infrequent in the Project area (*e.g*., killer whales were only observed on five or six days by the whale watching industry). Small groups of 5 to 6 transient killer whales per day could be observed throughout the summer months; therefore, we estimate that a group of 6 animals could enter the Project area on 6

occasions during the construction window, for a total of 36 takes by Level B harassment. No Level A takes of killer whales is authorized for this species. The maximum linear distance to the Level A threshold for killer whales is less than 250 meters (m) from the source and a MMO would be able to observe animals at this distance and shut down activities in time to avoid Level A take.

Harbor porpoise

Harbor porpoise are expected to occur in the Project area in low numbers during the construction window. Sightings during this time period are infrequent; this species is not observed every day. The mean group size of harbor porpoise in Southeast Alaska was estimated to be between 2 to 3 individuals (Dahlheim *et al*., 2009); therefore, we conservatively estimate that a group of three harbor porpoise may be present every other day of construction for a total of 105 takes by Level B harassment. The distances to Level A thresholds for harbor porpoise (HFC) are largest during impulse driving under Scenarios 3, 5, and 6 (see Table 1), and extend beyond the entrance to Symonds Bay. The duration of Scenarios 3, 5, and 6 is expected to be 30 days (see Table 1); therefore, we expect that a small group of three harbor porpoise may enter the Level A zone on half of the days of Scenarios 3, 5, and 6 (15 days) for a total of 45 takes by Level A harassment.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

All estimates are conservative and include the following assumptions:

- All pilings installed at each site would have an underwater noise disturbance equal to the piling that causes the greatest noise disturbance *(i.e*., the piling farthest from shore) installed with the method that has the ZOI. The largest underwater disturbance (Level B) ZOI would be produced by DTH drilling; therefore take

estimates were calculated using the vibratory pile-driving ZOIs. The ZOIs for each threshold are not spherical and are truncated by land masses on either side of the Project area, which would dissipate sound pressure waves.

- Exposures were based on an estimated total of 70 work days. Each activity ranges in number of days needed to be completed (Table 1).
- All marine mammal individuals potentially available are assumed to be present within the relevant area, and thus incidentally taken;
- An individual can only be taken once during a 24-hour period; and,
- Exposures to sound levels at or above the relevant thresholds equate to take, as defined by the MMPA.

Estimates of potential instances of take may be overestimates of the number of individuals taken. In the context of stationary activities such as pile driving and in areas where resident animals may be present, this number represents the number of total take that may accrue to a smaller number of individuals, with some number of animals being exposed more than once per individual. While pile driving and removal can occur any day throughout the in-water work window, and the analysis is conducted on a per day basis, only a fraction of that time (typically a matter of hours on any given day) is actually spent pile driving/removal. The potential effectiveness of mitigation measures in reducing the number of takes is typically not quantified in the take estimation process. For these reasons, these take estimates may be conservative.

Table 5. Calculations for Incidental Take Estimation.

Species	Takes authorized by Level A	Takes authorized by Level B

	harassment	harassment
Steller sea lion Eastern and Western stock	6	350
Harbor seal	13	350
Humpback whale	3	350
Killer whale Eastern North pacific Gulf of Alaska, Aleutian Island, and Bering Sea Transient stock and West Coast Transient stock	0	36
Harbor porpoise	45	105

Mitigation Measures

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully balance two primary factors:

1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat – which considers the nature of the potential adverse impact being mitigated

(likelihood, scope, range), as well as the likelihood that the measure will be effective if implemented; and the likelihood of effective implementation, and;

2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The ZOIs were used to develop mitigation measures for pile driving and removal activities at the Project area. The ZOIs effectively represent the mitigation zone that would be established around each pile to prevent Level A harassment to marine mammals, while providing estimates of the areas within which Level B harassment might occur. In addition to the specific measures described later in this section, the FAA would conduct briefings between construction supervisors and crews, marine mammal monitoring team, and staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Monitoring and Shutdown for Construction Activities

The following measures would apply to the FAA's mitigation through shutdown and disturbance zones:

Shutdown Zone – For all pile driving activities, the FAA will establish a shutdown zone intended to contain the area in which SPLs equal or exceed the auditory injury criteria for cetaceans and pinnipeds. The purpose of a shutdown zone is to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury of marine mammals (as described previously under *Potential Effects of the Specified Activity on Marine Mammals*, serious injury

or death are unlikely outcomes even in the absence of mitigation measures). Modeled radial distances for shutdown zones are shown in Table 6. However, a minimum shutdown zone of 10 m will be established during all pile driving activities, regardless of the estimated zone; and

Disturbance Zone – Disturbance zones are the areas in which SPLs equal or exceed 160 and 120 dB rms (for impulse and continuous sound, respectively). Disturbance zones provide utility for monitoring conducted for mitigation purposes (*i.e.*, shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the Project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting instances of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see *Monitoring and Reporting Measures*). Nominal radial distances for disturbance zones are shown in Table 6.

Given the size of the disturbance zone for vibratory pile driving and DTH drilling, it is impossible to guarantee that all animals would be observed or to make comprehensive observations of fine-scale behavioral reactions to sound, and only a portion of the zone (*e.g.*, what may be reasonably observed by visual observers stationed between Symonds Bay and Sitka Sound) would be observed. In order to document observed instances of harassment, monitors record all marine mammal observations, regardless of location. The observer's location, as well as the location of the pile being driven, is known from a GPS. The location of the animal is estimated as a distance from the observer, which is then compared to the location from the pile. It may then be estimated whether the animal was exposed to sound levels constituting incidental harassment on the basis of predicted distances to relevant thresholds in post-processing of

observational and acoustic data, and a precise accounting of observed incidences of harassment created. This information may then be used to extrapolate observed takes to reach an approximate understanding of actual total takes.

Table 6. Distances to Level A Shutdown and Level B Exposure Zones.

	Distance to Level A Shutdown zone (m)[1]											
	Scenario 1[2]		**Scenario 2[3]**		**Scenario 3**		**Scenario 4[3]**		**Scenario 5**		**Scenario 6**	
	22 days		16 days		9 days		2 days		5 days		16 days	
Species	Continuous	Impulse	Continuous	Impulse	Continuous	Impulse	Continuous	Impulse	Continuous	Impulse	Continuous	Impulse
Harbor Porpoise	50*	10	600	50	50*	800	400	100	10	1,600[4]	80	1,600[4]
Humpback whales	10	10	400	30	10	700	300	80	10	700	40	1,400
Harbor Seals	10	10	80	10	10	200	60	10	10	300	10	800
Killer whales	10	10	10	10	10	10	10	10	10	150	10	250
Steller sea lions	10	10	10	10	10	10	10	10	10	10	10	80
	Distance to Level B Exposure Zones (m)[1]											
All marine mammals	1,800	10	10,100[5]	800	5,000	600	10,100[5]	1,300	800	430	5,000	800

NOTE: Vibratory and impulse hammering will not happen simultaneously; there will be sufficient time tor MMOs to be notified and to adjust monitoring as needed. An MMO will be stationed at the mouth of the bay about 800 m from the noise source.
*Shutdowns for S1 and S3 during continuous activities were increased from the proposed IHA for harbor porpoise to be consistent with S6 where zones were increased when distances to thresholds were less than those for LFC.
[1]From Table 6-3 in the FAA's application rounded up as appropriate.
[2]Scenario 1 does not include impulse hammering
[3]Includes DTH drilling (non-impulsive).
[4]Actual Level A zone is larger (see Table 6-3 in the FAA's application), but 1.6 km (1 mile) is considered to be a reasonable distance to monitor.
[5]Takes will be extrapolated due to these large monitoring zones.

Monitoring Protocols – Monitoring would be conducted before, during, and after pile driving and vibratory removal activities. In addition, observers shall record all instances of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven. Observations made outside the shutdown zone will not result in shutdown; that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile driving activities would be halted. Monitoring will take place from 30 minutes prior to initiation through 30 minutes post-completion of pile driving and removal activities. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes. Please see Section 11 of the FAA's application (*www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*), for the FAA's monitoring protocols.

The following additional measures apply to visual monitoring:

(1) Monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. A minimum of two observers will be required for all pile driving/removal activities. MMO requirements for construction actions are as follows:

(a) Independent observers (*i.e.*, not construction personnel) are required;

(b) At least one observer must have prior experience working as an observer;

(c) Other observers (that do not have prior experience) may substitute education (undergraduate degree in biological science or related field) or training for experience;

(d) Where a team of three or more observers are required, one observer should be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer; and

(e) NMFS will require submission and approval of observer resumes.

(2) Qualified MMOs are trained biologists, and need the following additional minimum qualifications:

(a) Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;

(b) Ability to conduct field observations and collect data according to assigned protocols

(c) Experience or training in the field identification of marine mammals, including the identification of behaviors;

(d) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

(e) Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and

(f) Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

(3) Prior to the start of pile driving activity, the shutdown zone will be monitored for 30 minutes to ensure that it is clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; animals will be allowed to remain in the shutdown zone (*i.e.*, must leave of their own volition) and their behavior will be monitored and documented. The shutdown zone may only be declared clear, and pile driving started, when the entire shutdown zone is visible (*i.e.*, when not obscured by dark, rain, fog, *etc*.). In addition, if such conditions should arise during impact pile driving that is already underway, the activity would be halted.

(4) If a marine mammal approaches or enters the shutdown zone during the course of pile driving operations, activity will be halted and delayed until either (A) the animal has voluntarily left and been visually confirmed beyond the shutdown zone, (B) 15 minutes have passed without re-detection of small cetaceans and pinnipeds, or (C) 30 minutes have passed without re-detection of large cetaceans, whichever happens sooner. Monitoring will be conducted throughout the time required to drive a pile.

(5) If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, approaches or is observed within the Level B harassment zone, activities will shut down immediately using delay and shut-down procedures. Activities will not restart until the animals have been confirmed to have left the area.

Soft Start

The use of a soft start procedure is believed to provide additional protection to marine mammals by warning or providing a chance to leave the area prior to the hammer operating at full capacity, and typically involves a requirement to initiate sound from the hammer at reduced energy followed by a waiting period. This procedure is repeated two additional times. It is

difficult to specify the reduction in energy for any given hammer because of variation across drivers and, for impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in "bouncing" of the hammer as it strikes the pile, resulting in multiple "strikes." For impact driving, we require an initial set of three strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then 2 subsequent 3 strike sets. Soft start will be required at the beginning of each day's impact pile driving work and at any time following a cessation of impact pile driving of 30 minutes or longer.

Noise attenuating devices

The FAA will use cushions during impact pile driving.

Timing Restrictions

The FAA will only conduct construction activities during daytime hours. Construction will also be restricted to the months of May through September to avoid overlap with times when marine mammals have higher densities in the Project area.

We have carefully evaluated the FAA's mitigation measures and considered their effectiveness in past implementation to determine whether they are likely to effect the least practicable impact on the affected marine mammal species and stocks and their habitat.

Any mitigation measure(s) we prescribe should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

(1) Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal);

(2) A reduction in the number (total number or number at biologically important time or location) of individual marine mammals exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only);

(3) A reduction in the number (total number or number at biologically important time or location) of times any individual marine mammal would be exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only);

(4) A reduction in the intensity of exposure to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing the severity of behavioral harassment only);

(5) Avoidance or minimization of adverse effects to marine mammal habitat, paying particular attention to the prey base, blockage or limitation of passage to or from biologically important areas, permanent destruction of habitat, or temporary disturbance of habitat during a biologically important time; and

(6) For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Based on our evaluation of the FAA's measures, as well as any other potential measures considered by NMFS, NMFS has determined that the mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting Measures

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking.

The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical to both compliance and ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species in action area (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) population, species, or stock;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Visual Marine Mammal Observations

The FAA will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All MMOs will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. A minimum of two MMOs will be required for all pile driving/removal activities. The FAA will monitor the shutdown zone and disturbance zone before, during, and after pile driving, with observers located at the best practicable vantage points. Based on our requirements, the FAA would implement the following procedures for pile driving and removal:

- MMOs would be located at the best vantage point(s) in order to properly see the entire shutdown zone and as much of the disturbance zone as possible;
- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals;
- If the shutdown zones are obscured by fog or poor lighting conditions, pile driving at that location will not be initiated until that zone is visible. Should such conditions arise while driving, removal, or drilling is underway, the activity would be halted; and
- The shutdown and disturbance zones around the pile will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Data Collection

We require that observers use approved data forms. Among other pieces of information, the FAA will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, the FAA will attempt to distinguish between the

number of individual animals taken and the number of incidences of take. We require that, at a minimum, the following information be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (*e.g.*, percent cover, visibility);
- Water conditions (*e.g.*, sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel, and if possible, the correlation to SPLs;
- Distance from pile driving or removal activities to marine mammals and distance from the marine mammals to the observation point;
- Description of implementation of mitigation measures (*e.g.*, shutdown or delay);
- Locations of all marine mammal observations; and
- Other human activity in the area.

Sound Source Verification

The SSV will establish source levels for impact pile driving, vibratory pile driving, and DTH drilling. The FAA will provide all monitoring data to NMFS. The reports would include the following information:

1. Size and type of piles;
2. A detailed description of the noise attenuation device, including design specifications;
3. The impact hammer energy rating used to drive the piles, and the make and model of the hammer and the output energy;
4. The physical characteristics of the bottom substrate into which the piles were driven;

5. The depth of water into which the pile was driven;

6. The depth into the substrate into which the pile was driven;

7. A description of the sound monitoring equipment;

8. The distance between hydrophones and pile;

9. The depth of the hydrophones and depth of water at hydrophone locations;

10. The distance from the pile to the water's edge;

11. The total number of strikes to drive each pile and for all piles driven during a 24-hour period;

12. The results of the hydroacoustic monitoring;

13. Source levels for peak and RMS SPLs and single strike SEL at 10 m from the pile, and RMS pulse duration that contains 90 percent of pulse energy.

14. The distance at which peak, cumulative SEL, and RMS values exceed the respective threshold values;

15. For vibratory pile driving, SEL based on 30 second averaging of sound intensity;

16. The spectragraphs for each pile type; and

17. A description of any observable marine mammal behavior in the immediate area and, if possible, correlation to underwater sound levels occurring at that time.

A minimum of two piles of the 18-in and two piles of the 30-in piles for each construction type (*i.e*. impact and vibratory pile driving and DTH drilling) will be monitored. Piles chosen to be monitored will be representative of the different sizes and range of typical water depths at the project location where piles will be driven with an impact or vibratory hammer.

One bottom-mounted hydrophone will be placed at the nearest distance, approximately 10 meters, from each pile being monitored. An additional hydrophone will be placed at mid-water depth at a distance of 100 to 200 m from the pile to provide two sound-level readings

during ambient and pile driving conditions. A third hydrophone may be deployed at a greater distance (*e.g.*, 1-2 km or further) for the purpose of better defining the long-distance sound propagation. Underwater sound levels will be continuously monitored during the entire duration of each pile being driven. Sound levels will be measured in dB re: 1 μPa.

Reporting

A draft report will be submitted to NMFS within 90 days of the completion of marine mammal monitoring, or 60 days prior to the requested date of issuance of any future IHA for projects at the same location, whichever comes first. The report will include marine mammal observations pre-activity, during-activity, and post-activity during pile driving and removal days, and will also provide descriptions of any behavioral responses to construction activities by marine mammals and a complete description of all mitigation shutdowns and the results of those actions and an extrapolated total take estimate based on the number of marine mammals observed during the course of construction. A final report must be submitted within 30 days following resolution of comments on the draft report.

Negligible Impact Analysis and Determinations

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the

context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels). To avoid repetition, because the expected impacts to marine mammals of the affected species and stocks are similar (and we have no information to suggest otherwise), our discussion here applies to each of them.

Pile driving and removal activities associated with the dock replacement Project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level A and Level B harassment (PTS and behavioral disturbance), from underwater sounds generated from pile driving and removal. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving and removal occurs. Most of the Level A takes are precautionary as marine mammals are not expected to enter and stay in the Level A ensonified area for the duration needed to incur PTS. However, if all authorized takes be Level A harassment were to occur, they would be of small numbers compared to the stock sizes and would not adversely affect the stock through effects on annual rates of recruitment or survival. Additionally, the FAA's mitigation measures, including a shutdown of construction activities if animals enter the Level A zone, further reduces the chance for PTS in marine mammals. Therefore, the effects to marine mammals are expected to be negligible.

No temporary threshold shift (TTS), serious injury, or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory and impact hammers and drilling will be the primary methods of installation. Impact pile driving produces short, sharp pulses with higher peak levels and much sharper rise time to reach those peaks. If impact driving is necessary, implementation of soft start and shutdown zones significantly reduces any possibility of injury. Given sufficient "notice" through use of soft start (for impact driving), marine mammals are expected to move away from a sound source that is annoying prior to it becoming potentially injurious, however, as noted previously a small number of potential takes by PTS are authorized and have been analyzed. The FAA will use a minimum of two MMOs stationed strategically to increase detectability of marine mammals, enabling a high rate of success in implementation of shutdowns to avoid injury.

The FAA's Project activities are localized and of relatively short duration (a maximum of 70 days for pile driving and removal). The entire Project area is limited to Symonds Bay and into Sitka Sound for some scenarios. These localized and short-term noise exposures may cause short-term behavioral modifications in harbor seals, Steller sea lions, harbor porpoises, killer whales, and humpback whales. Moreover, the mitigation and monitoring measures are expected to reduce the likelihood of injury. Additionally, no important feeding and/or reproductive areas for marine mammals of any of these species/stocks are known to be within the ensonified area during the construction window.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions

such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff 2006; Lerma 2014). Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction are not expected to occur given the short duration and small scale of the project activities. Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving and drilling, although even this reaction has been observed primarily only in association with impact pile driving. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. Non-auditory physiological effects and masking are not expected to occur from the FAA's Project activities.

The Project also is not expected to have significant adverse effects on affected marine mammals' habitat. The Project activities would not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range. However, because of the short duration of the activities and the relatively small area of the habitat that may be affected, and the decreased potential of prey species to be in the Project area during the construction work window, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or authorized;

- Level B harassment may consist of, at worst, temporary modifications in behavior (*e.g.* temporary avoidance of habitat or changes in behavior);
- The lack of important feeding, pupping, or other areas in the action area during the construction window;
- Mitigation is expected to minimize the likelihood and severity of the level of harassment; and
- The small percentage of the species/stock that may be affected by Project activities (< 15 percent for all species/stocks).

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the FAA's construction activities will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Table 7 details the number of instances that animals could be exposed to received noise levels that could cause Level A and Level B harassment for the planned work at the Project site relative to the total stock abundance. The numbers of animals authorized to be taken for each species or stock is considered small relative to the relevant species or stock size even if each

estimated instance of take occurred to a new individual. The total percent of the population (if each instance was a separate individual) for which take is requested is less than 15 percent for each stock (Table 7). For pinnipeds, especially harbor seals occurring in the vicinity of the Project area, there will almost certainly be some overlap in individuals present day-to-day, and the number of individuals taken is expected to be notably lower.

Based on the analysis contained herein of the Project activities (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Table 7. Estimated Numbers and Percentage of Stock That May Be Exposed to Level A and Level B Harassment.

Species	Authorized Level A Takes	Authorized Level B Takes	Stock(s) Abundance Estimate[1]	Percentage of Total Stock (percent)
Harbor Seal (*Phoca vitulina*) *Sitka/Chatham stock*	13	350	14,855	2.44
Steller sea lion (*Eumatopias jubatus*) *Western U.S. Stock* *Eastern U.S. Stock*	6	350	50,983 41,638	0.698 0.855
Killer whale (*Orcinus orca*) *Eastern North Pacific, Gulf of AK, Aleutian Island, and Bering Sea Transient Stock* *West Coast Transient Stock*	0	36	587 243	6.13 14.8
Humpback whale (*Megaptera noviaengliae*) *Central North Pacific Stock*	3	350	10,103	3.49
Harbor Porpoise (*Phocoena phocoena*) *Southeast Alaska Stock*	45	105	11,146	1.34

[1] All stock abundance estimates presented here are from the 2016 Alaska Stock Assessment Report

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as: an impact resulting from the specified activity: (1) That is likely to reduce the availability of

the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

Harbor seals and Steller sea lions are subsistence harvested in Alaska. During 2012, the estimated subsistence take of harbor seals in southeast Alaska was 595 seals with 49 of these taken near Sitka (Wolfe *et al.*, 2013). This is the lowest number of seals taken since 1992 (Wolfe *et al.*, 2013) and is attributed to the decline in subsistence hunting pressure over the years as well as a decrease in efficiency per hunter (Wolf *et al.*, 2013).

The peak hunting season in southeast Alaska occurs during the month of November and again over the March to April time frame (Wolfe *et al.*, 2013). This corresponds to times when seals are aggregated in shoal areas as they prey on forage species such as herring, making them easier to find and hunt.

The Project is in an area where subsistence hunting for harbor seals or sea lions could occur (Wolfe *et al.*, 2013), but the location is not preferred for hunting. There is little to no hunting documented in the vicinity and there are no harvest quotas for non-listed marine mammals. For these reasons and the fact that Project activities would occur outside of the primary subsistence hunting seasons, there would be no impact on subsistence activities or on the availability of marine mammals for subsistence use.

To satisfy requirements under Section 106 of the National Historic Preservation Act, R&M Consultants, Inc. reached out to the Sitka Tribe of Alaska, Central Council of the Tlingit

and Haida, and Sealaska regarding cultural resources in 2016. No issues or concerns with the Project were raised during this effort.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from the FAA's activities.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the Alaska Regional Office, whenever we propose to authorize take for endangered or threatened species.

NMFS is authorizing take of two DPSs (*i.e*., western DPS of Steller sea lions and Mexico DPS of humpback whales), which are listed under the ESA. The Permit and Conservation Division requested initiation of Section 7 consultation with the Alaska Region for the issuance of this IHA. The NMFS Alaska Regional Office Protected Resources Division issued a Biological Opinion in October, 2017 under section 7 of the ESA, on the issuance of an IHA to the FAA under section 101(a)(5)(D) of the MMPA by the NMFS Permits and Conservation Division. The Biological Opinion concluded that the proposed action is not likely to jeopardize the continued existence of western DPS Steller sea lions or Mexico DPS of humpback whales, and is not likely to destroy or adversely modify western DPS Steller sea lion critical habitat.

Authorization

NMFS has issued an IHA to the FAA for the potential harassment of small numbers of five marine mammal species incidental to the Biorka Island dock replacement project in Sitka, AK, provided the previously mentioned mitigation, monitoring and reporting requirements are incorporated.

Dated: October 25, 2017.

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Donna S. Wieting

Director, Office of Protected Resources,

National Marine Fisheries Service.

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